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(71) Applicant(s)

Graco Children's Products Inc.
(Incorporated in USA - Delaware)
51 South Pine Street, Elverson, Pennsylvania 19520,
United States of America

(72) Inventor(s)

Robert C. Barrett

(51) INT CL⁷

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E2A AAN ACMK A121 A122 A400 A433
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(58) Field of Search

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INT CL⁷ A44B , B60N , F16B
Online: EPODOC JAPIO WPI

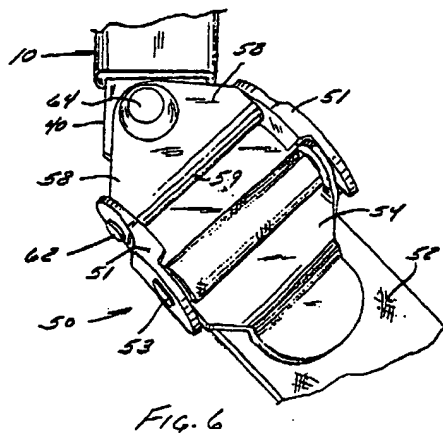
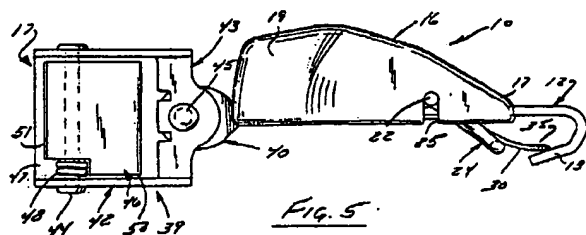
(74) Agent and/or Address for Service

Edward Evans Barker
Clifford's Inn, Fetter Lane, LONDON, EC4A 1BZ,
United Kingdom

(54) Abstract Title

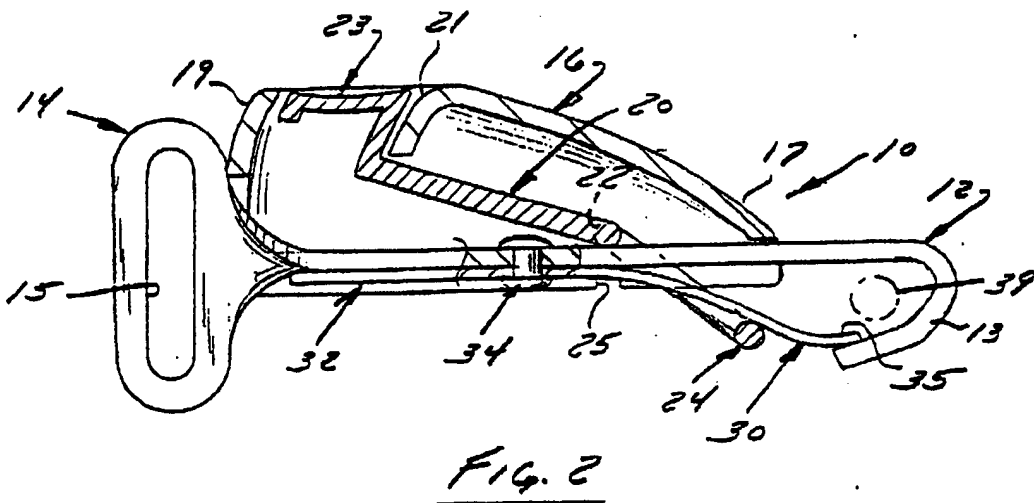
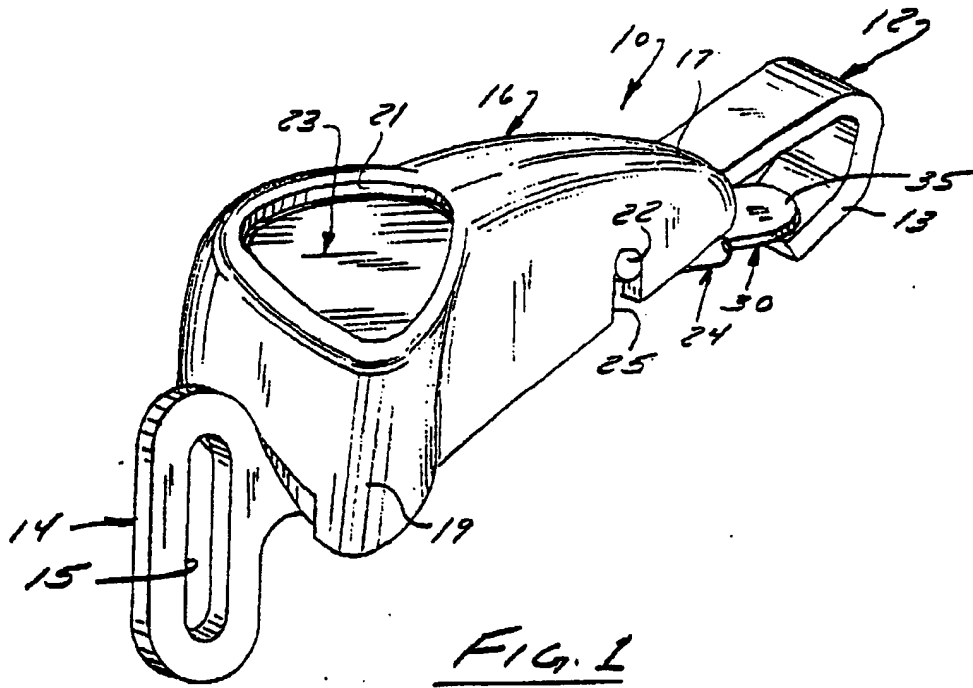
Hook and tether strap length adjuster

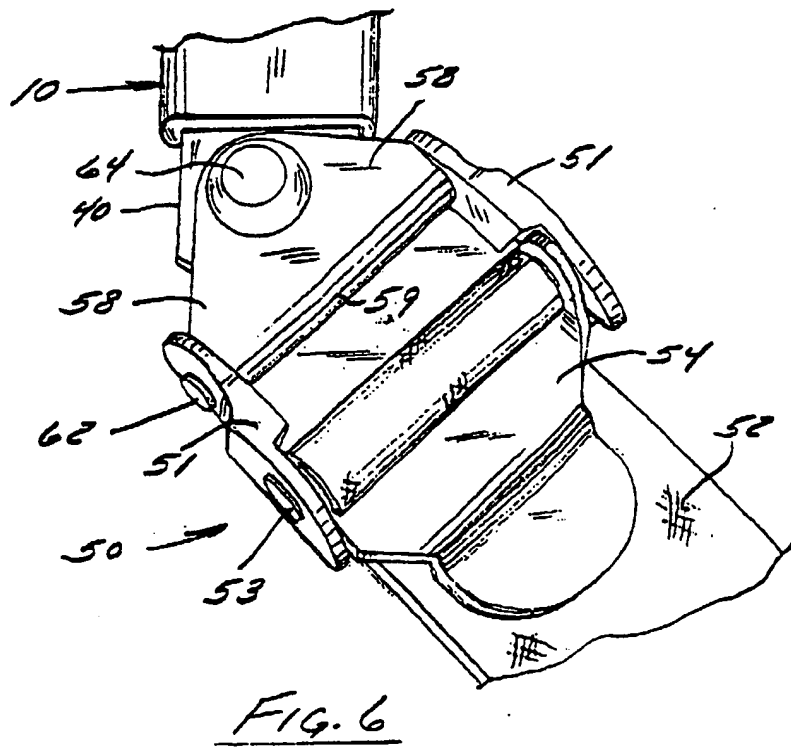
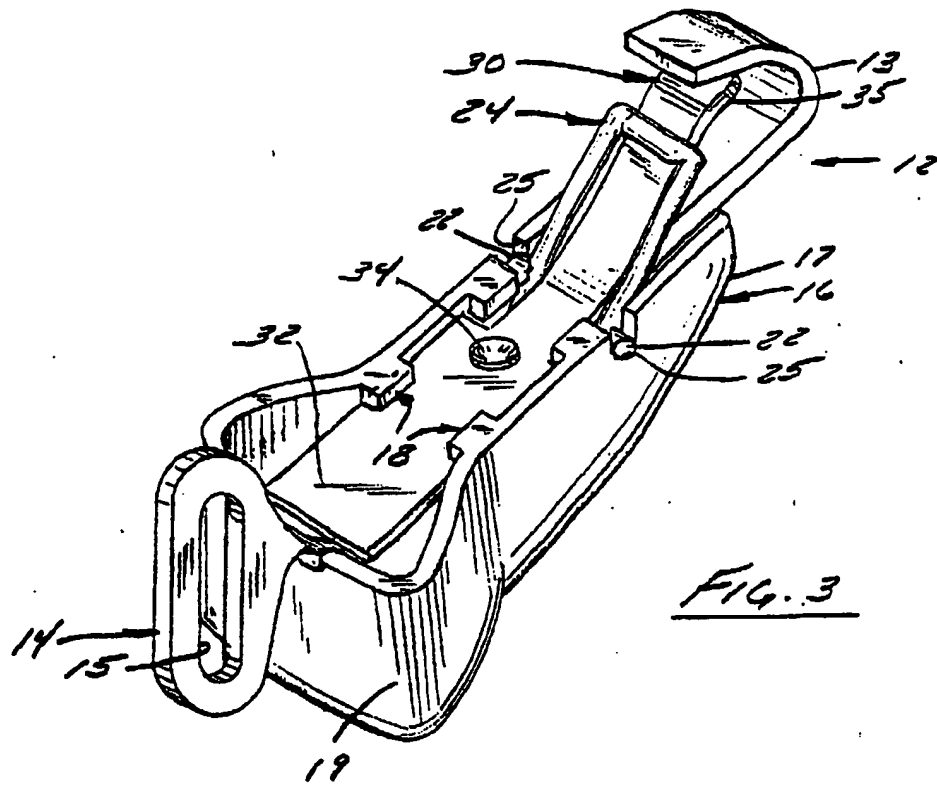
(57) A hook and tether strap length adjuster for attaching a child vehicle seat to an anchorage comprises: a hook 10 for engaging the anchorage; and a tether strap length adjuster 39,50 coupled to the hook and permitting pivotal rotation therebetween about an axis. Also disclosed is a latch 10 for attaching a tether strap of a child vehicle seat [not shown] to an anchorage 39 which comprises: a hook 13 for engaging the anchorage 39; a guard 30 to prevent disengagement of the hook from the anchorage when the guard is in a first position, and to permit disengagement of the hook when the guard is in a second position; an actuator 20 for moving the guard between the first and second positions; and a receiver 14 for attaching the tether strap to the latch. Preferably the guard is a spring plate and the actuator is a pivoted lever connected to the guard. The actuator may be operated by a push button 23. The receiver may include a tether strap length adjuster [e.g. 39, fig. 4] which is pivotally connected to the remainder of the latch. In a further embodiment the latch may comprise: an elongate metal stamping having a hook at one end and a tether strap attachment at the other; a spring plate guarding the hook; a cover for the stamping and the guard; a lever extending through the cover and engaging the spring plate; and a rod extending through aligned openings in the cover.



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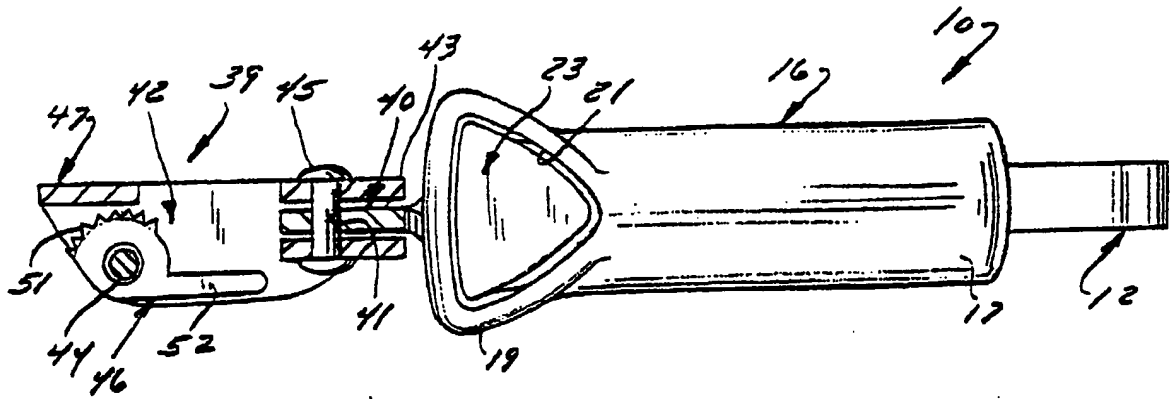


FIG. 4

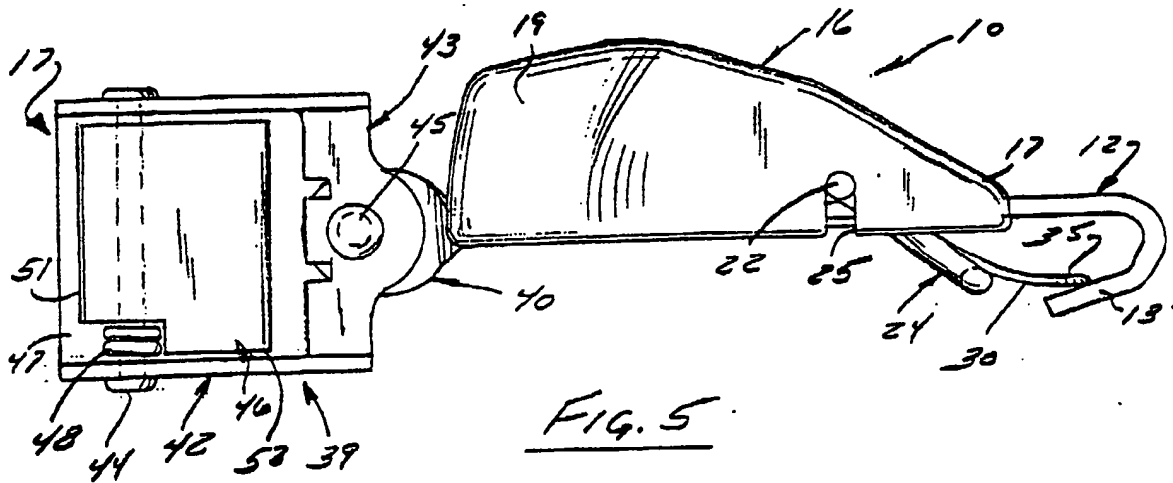


FIG. 5

TETHER LATCH

BACKGROUND OF THE INVENTION

Field Of The Invention

The present invention relates generally to the art of tether straps for children's vehicle seats, and more particularly to a latch for securely attaching one end of a tether strap to an anchorage located on the vehicle. Still more specifically, and in a preferred embodiment, the invention relates to a latch having a push button which is remote from the hook portion of the latch and which includes a tether strap attachment opening to allow coupling of the tether strap directly to the latch. In another embodiment the invention relates to a latch having a plate with an opening and a pivot assembly to prevent bunching or twisting of the tether strap.

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Description Of The Prior Art

It has been known for many years that infant, toddler or children's vehicle seats (herein generally referred to as "child vehicle seats") can be secured to a vehicle using the restraint belts provided with the vehicle, e.g. shoulder and/or lap belts), and that additional top tether straps may be employed. For example, Ryan, in United States Patent No. 5,265,931 issued November 30, 1993 for "Detachable

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Child Seat And Supporting Frame" shows a top tether strap 48 having a "J" hook on its end to assist in securing a child vehicle seat to a vehicle. In this particular patent, the tether strap is secured to a shelf (commonly called a "package shelf") behind the rear seat.

5 Another tether strap system is disclosed in Anthony, et al. United States Patent No. 5,695,243 issued December 9, 1997 for "Child Seat Mount With Anti-Twist Web Mechanism", in which a tether strap is used when the seat is either in a forward or rearward facing orientation. This tether is also coupled to the package shelf using a buckle similar to that of a conventional seat belt buckle.

10 Additional tether restraints are shown in United States Patent No. 5,630,645 issued May 20, 1997 to Lumley, et al. for "Safety Seat Tether Strap" and in United Kingdom Patent Specification No. 1,374,266 dated January 7, 1963, entitled "Improvements In And Relating To Children's Safety Seats For Use In Vehicles And Craft". In the latter, two straps are employed for releasable coupling to the
15 seat to two anchorages located on the vehicle.

Recent regulations promulgated in the United States have required vehicle manufacturers to place anchorages in their products so that child vehicle seats can be more securely coupled to the vehicles. Regulations in effect since 1999 resulted in the addition of an anchorage for the top part of the seat, to reduce head excursion.
20 By September 1, 2002, child vehicle seat manufacturers will be required to include a provision on the child vehicle set to secure it to a pair of lower anchorages provided in vehicles which will consist of round metal bars spaced 280mm, center-to-center, and be located in the rear seats at the crease where the seat back and the seat cushion come together. Many car seat manufacturers will accomplish this through
25 the inclusion of additional tether straps to the lower portion of their products, so that the tether straps can be coupled to the round metal bars in the vehicle. The development of strong and easy to use latches for these various tether strap anchorages is important, and in the case of the lower anchorages, the attachment of conventional "J" hooks will be difficult because of the placement of the anchorages
30 relative to the seat components. Improvements in latch systems for use in these

environments, particularly ones in which strap strength is optimized through appropriate alignment of the latches and the seat will represent significant advances in this art.

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FEATURES AND SUMMARY OF THE INVENTION

A principal feature of the present invention is to provide a latch which allows for the remote coupling and un-coupling of a hook about an anchorage.

A different feature of the present invention is to provide a latch which is easy to operate and which may be used with package shelf or lower seat anchorages.

10 Another feature of the present invention is to provide a latch in which certain of the operating components are substantially enclosed to prevent interference therewith by dirt, crumbs, and the like.

Yet another feature of the present invention is provide a system for coupling an anchorage latch to a tether strap which permits rotation of the strap with respect
15 to the latch in at least one plane.

A still further feature of the present invention is to provide a latch which includes a system for coupling a tether strap to a latch and which permits rotation of the latch with respect to the belt in two perpendicular planes.

How these and other features of the invention are provided will be described
20 in the following detailed description of the preferred and two alternate embodiments of the invention taken in conjunction with the drawings. Generally, however, the features are provided individually, or in various sub-combinations, by providing a latch which includes a push button lever mechanism for selectively permitting a hook to be placed over or removed from an anchorage, the latch preferably
25 including a cover and a spring plate to substantially enclose the operating components. In the preferred embodiment, the operation of the latch is carried out using a push button which is located remotely from the hook, thereby facilitating use

of the latch in lower anchorage locations, as well as with package shelf tether strap systems. The tether strap may be attached directly to a loop provided on the latch or, more preferably, may be attached to a plate which is pivotally coupled to the latch to permit strap alignment with the latch. In its most preferred form, the latch
5 is pivotally coupled to a plate which in turn is pivotally coupled to a strap length adjuster, thereby permitting movement of the strap with respect to the latch in two planes which are perpendicular to one another to prevent bunching or twisting of the strap. Other ways in which individual features or combinations of the above-mentioned features or other features of the invention will become apparent to those
10 skilled in the art after they have read the present specification. Accordingly, the present invention is not deemed to be limited to the embodiments described below, but it is to be limited solely by the scope of the claims which follow.

DETAILED DESCRIPTION OF THE DRAWINGS

15 In the following FIGURES like reference numerals are used to indicate like components, and

FIGURE 1 is a perspective view of a latch according to a preferred form of the invention;

FIGURE 2 is a sectional view showing the internal components of the latch
20 shown in FIGURE 1;

FIGURE 3 is a bottom perspective view of the latch shown in FIGURES 1 and 2;

FIGURE 4 is a top view of an alternate embodiment of a latch according to the present invention and including a sectional view of a strap length adjuster used
25 therewith;

FIGURE 5 is a side view of the latch and strap adjuster shown in FIGURE 4; and

FIGURE 6 is a perspective view of a second alternative embodiment of the present invention showing a latch and a strap adjuster which permits movement of the strap about two perpendicular axes.

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DETAILED DESCRIPTION OF THE PREFERRED
AND TWO ALTERNATE EMBODIMENTS

Before proceeding to the description of the preferred and two alternate embodiments of the present invention, several general comments can be made about the applicability and the scope of the present invention. First, while both a
10 preferred latch and two alternate alignment systems are illustrated in the present application, the latch may be used without the alignment systems and the alignment systems may be used with latches other than the one shown in the drawings. For example, the alignment systems may be used with common "J" hooks of the type presently in use.

15 Second, the FIGURES provided with this specification show two different types of strap length adjusters, but the type of adjuster, in and of itself, does not form part of the present invention, and the adjuster type may be selected from any of those known to be art. Adjusters used in cars, trucks, airplanes and numerous other environments, in which the length of a belt or strap is adjusted for safety,
20 convenience or the like, may be used with the present invention.

Third, the way in which the tether straps partially depicted in certain FIGURES are attached to the child vehicle seat can also be variously embodied and does not, in and of itself, form part of the present invention. By way of example, but not by way of limitation, the child vehicle seat can have anchorage bars similar
25 to those used in the vehicle, and a latch mechanism such as that illustrated, may be used to attach both ends of a tether strap respectively to the vehicle anchorage and to the seat anchorage. Alternately, the strap could be attached to the seat using fasteners, adhesives, and the like. With regard to the lower anchorages, either a single strap with a latch at each end and passing through the child vehicle seat may

be employed, or a pair of straps may be used which are separately anchored to the child vehicle seat.

Fourth, the particular shape of the latch shown in the FIGURES is not critical nor is the particular distance between the hook portion of the latch and the push button or the strap attachment opening. It is advantageous, however, to have that distance exceed about 50 millimeters, so that the latch may be easily operated, even when the anchorage is located within the crease of the rear vehicle seat. In this connection, it should be understood that the particular hook mechanism employed will require that the hook pass beyond the anchorage and that the disclosed spring-plate be pressed thereover, after which the hook portion is retracted somewhat. When detaching the latch from the anchorage, the spring-plate is moved out of the way and the latch is removed by urging the hook portion forwardly, raising it above the anchorage, and pulling the latch away from the anchorage.

Fifth, the particular materials employed for manufacture of the latch are dictated primarily by strength requirements, but such components as the cover for the latch may be made out of lightweight materials such as plastics, sheet metal stampings and the like.

Sixth, the term "vehicle" as used herein is meant to include vehicles where infant, toddler or child seats are used, e.g. automobiles, sport utility vehicles, vans, trucks, planes, buses, trains, boats and the like.

Proceeding now to a description of the preferred and two alternate embodiments of the invention, FIGURE 1 is a perspective view of a preferred latch. The latch includes four major components: a metal stamping 12, a cover 16, a lever 20, and a spring-plate 30.

As can best be appreciated by reference to FIGURES 1 and 2, the metal stamping 12 has a hook portion 13 at one end and a strap connector 14 at the opposite end. Strap connector 14 has an opening 15 therein adapted to receive a tether strap (not shown). The distance between the hook 13 and strap connector 14 can be varied, as indicated above, but is preferably 70 mm or longer.

The cover 16 is adapted to fit over metal stamping 12, and as will be better appreciated from the description which follows shortly, will snap into place and will serve to partially cover the internal components and prevent interference therewith by dirt, crumbs and the like. Cover 16 may have a shape designed primarily for aesthetic purposes, and in the disclosed embodiment includes a nose portion 17 and a thicker rear portion 19 having an opening 21 in the top thereof.

Located within cover 16 is a lever 20 which includes a push button 23 at one end, sized and arranged to fit within opening 21 in the cover 16. The lever further includes a loop 24 at its opposite end which extends on either side of metal stamping 12. The cover 16 includes a pair of aligned openings 25 to accommodate a pivot rod 22 located at a mid section of lever 20, as best seen in FIGURES 1 and 2.

The latch 10 also includes an elongate spring-plate 30 which has a first portion 32 which extends below metal stamping 12 and is coupled thereto by a rivet 34 or other suitable fastener. At the hook end of latch 10, the spring-plate 30 bends downwardly, extends through loop 24 and has an end 35 which normally is biased against the hook portion 13 of metal stamping 12.

By reference to FIGURE 3, it will be noted that a plurality of snaps 18 are formed in cover 16 and are arranged to snap in place as the cover 16 is placed over the metal stamping 12, lever 20 and spring-plate 30.

From the foregoing description it will be appreciated that latch 10 may be coupled to an anchorage 39 (shown in phantom in FIGURE 2) by pressing downwardly on the latch 10 when the anchorage 39 is positioned between the tip of hook 13 and the end of loop 24. By pushing downwardly, the end 35 of spring-plate 30 is pushed upwardly, to allow the anchorage bar 39 to enter the hook 13. After it is in place, the end 35 of the spring-plate 30 snaps downwardly to the position shown in FIGURE 2.

To release the latch 10 from the anchorage 39, push button 23 is depressed by the operator, causing lever 20 to pivot. Loop 24 urges the bent portion of spring-plate 30 upwardly, thereby opening a gap for anchorage 39.

It is apparent from the foregoing description of FIGURES 1-3 that the latch 10 may be used with a tether strap secured within opening 15 of the metal stamping 12. Alternately, a metal plate 40 may be provided instead of strap connector 14, as is illustrated in FIGURES 4 and 5. Plate 40 includes an opening 41 for purposes
 5 which will become more apparent shortly. A strap adjuster 39 is also illustrated in these FIGURES and includes a stamping 42 pivotally attached by a rivet 45 to plate 40. The strap adjuster stamping 39 itself consists of a flat end 47 and a rolled over end 43. By the nature of the rolled over end 43, rivet 45 is subjected to double shear when inserted under tension.

10 Another rivet 44 acts as a pivot for cam 46 which is spring loaded by a torsion spring 48. Torsion spring 48 causes cam 46 to pivot, urging the serrated teeth 51 to clamp a tether strap against the stamping 42 at the flat end 47. When a user presses the free end 52 of cam 46 toward the metal stamping 42, the belt is released, as is well known for this particular type of adjuster.

15 What is important to understand with regard to FIGURES 4 and 5 is that the adjuster 39 and the strap which would be attached thereto may move in a plane defined by plate 40, about the axis of rivet 45, thereby enhancing the ability of the latch to align itself with respect to the child vehicle seat and the anchorage.

A further embodiment of the invention is shown in FIGURE 6, where a
 20 different type of strap adjuster 50 is shown for use with latch 10. Plate 40 is also used, but the adjuster illustrated here includes a tab 54 pivotally mounted about rivet 53 to allow the length of a strap 52 to be adjusted. A pair of plates 51 are parallel to each other and are spaced apart by a distance which slightly exceeds the width of the strap 52. At the forward end of the plates 51 (i.e. the end closest to latch 10)
 25 another rivet 62 passes through both plates 51 and supports a curled portion 59 of a triangular plate 58. Plate 58 is pivotally connected to plate 40 by rivet 64.

This embodiment differs from that shown in FIGURES 4 and 5 in that the strap 52 may move in two perpendicular planes defined by the axes of the respective rivets 61 and 64. Alignment of the latch and seat is desirable because it prevents the

strap from bunching or twisting, which in turn could cause a reduction in the ability of the strap to absorb stresses across its entire width.

While the present invention has been described in connection with a preferred and two alternate embodiments shown in FIGURES 1-6, the invention is
5 not to be limited by any particular illustration, dimension, material or adjuster mechanism but is to be limited solely by the scope of the claims which follow.

CLAIMS

1. A hook and adjuster for attaching a child vehicle seat tether strap to an anchorage comprising:
 - a hook for engaging an anchorage; and
 - a tether strap length adjuster coupled to the hook and permitting pivotal rotation therebetween about an axis.
2. The hook and adjuster of Claim 1 wherein the hook includes an adjuster attachment opening and the adjuster includes a hook attachment opening, a fastener passing through both openings and permitting rotation about the axis of the fastener.
3. The hook and adjuster of Claim 1 wherein the hook and adjuster are coupled together in a manner permitting pivotal rotation therebetween about two perpendicular axes.
4. The hook and adjuster of Claim 1 wherein the hook further comprises a plate having a hole therein and the adjuster comprises a plate having a hole therein, a fastener coupling the two plates for rotation about a first axis, the plate of the adjuster being pivotally coupled to the balance of the adjuster for pivotal movement about a second axis perpendicular to the first axis.
5. A hook and adjuster for attaching a child vehicle seat tether strap to an anchorage, substantially as described herein with reference to and as illustrated in Figures 1 to 3, Figures 4 and 5 or Figures 6 of the accompanying drawings.



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Application No: GB 0123148.9
 Claims searched: 1-5

Examiner: Barnaby Wright
 Date of search: 12 December 2001

Patents Act 1977

Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
 UK Cl (Ed.S): E2A; E2F
 Int Cl (Ed.7): A44B; B60N; F16B
 Other: Online: EPODOC, JAPIO, WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X,P	GB 2351118 A (NATIONAL MOLDING) See especially figs 1-5 & 11-13, and page 7, ln 17 to page 9, ln 7, and page 16, ln 7 to page 18, ln 22.	1
X	GB 2284228 A (CHOU) See especially figs 8 & 9, and page 1, ln 15 to page 2, ln 13.	1
X, Y	GB 1129999 (BUTTONS LIMITED) See whole document, especially figs 1-3, and page 1, ln 43-76.	X: 1 Y: 2
X, Y	GB 0867510 (HARLEY PATENTS) See whole document, especially figs 1 & 2.	Y: 2
X	GB 0341345 (BURNS) See whole document, especially figs 1-4.	1, 3
X	WO 01/34428 A1 (IGC) See especially figs 5-7, and page 5, ln 3-5.	1

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.



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Application No: GB 0123148.9
Claims searched: 1-5

Examiner: Barnaby Wright
Date of search: 12 December 2001

Category	Identity of document and relevant passage	Relevant to claims
X, Y	US 4559678 (BIRKENSTOCK) See especially figs 10 & 11, and col 7, ln 48 to col 8, ln 45.	X: 1 Y: 2

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.